IN THE DRAWINGS:

The attached sheet of drawings includes changes to Fig. 10. This sheet, which includes Figs. 10, replaces the original sheet including Figure 10. In Figure 10, element 1012b is correctly identified and one of the lines from the element labeled "MATCHING NETWORK" is now correctly attached to element 1012b.

Attachment: **Replacement Sheet**
Annotated Sheet Showing Changes

REMARKS

This is intended as a full and complete response to the Office Action dated September 23, 2005, having a shortened statutory period for response set to expire on December 23, 2006. Please reconsider the claims pending in the application for reasons discussed below.

In amended Figure 10, element 1012b is correctly identified and one of the lines from the element labeled "MATCHING NETWORK" is now correctly attached to element 1012b.

Claims 1-4, 6-21, 23-33, and 35-49 remain pending in the application and are shown above. Claims 2 and 19 have been cancelled by Applicant and claims 35-49 stand withdrawn by the Examiner. Claims 1-4, 6-21, 23-33, and 35-49 stand rejected. Reconsideration of the rejected claims is requested for reasons presented below.

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C § 121:

I. Claims 1-4, 6-21, 23-33 and 48-49, drawn to a method, classified in class 216, subclass 59.

II. Claims 35-47, drawn to an apparatus, classified in class 156, subclass 345.25.

Election to one of the following species in group I is required under 35 U.S.C § 121:

Specie A: directed to a method of pre-etch measurement and detection of end point in-situ.

Specie B: directed to a specific algorithm related to in-situ metrology.

Applicants elect Invention I, claims 1-4, 6-21, 23-33 and 48-49, and specie A, claims 1-4, 6-21, and 23-33, with traverse.

The Examiner asserts that inventions I and II are related as process and apparatus for its practice. The Examiner asserts that the apparatus claimed could be used for any plasma processing process like deposition, heat treatment, inspection and metrology.

Separate searches would likely identify the same references for the claims of Group I and Group II, as identified by the Examiner. Thus, the process and apparatus are related and should be examined together.

Claim Rejections 102(b)

Claims 1, 3-4, 6-7, 17-18, 20, and 23-24 stand rejected under 35 U.S.C. § 102(b) as being anticipated by *Toprac* (U. S. Patent No. 6,379,980). Applicant respectfully responds to the rejection.

Toprac does not teach all the claim limitations of claims 1 and 18, and claims dependent thereon. *Toprac* teaches measuring the thickness of a process layer, removing at least a portion of the process layer until an end point of the removal process is reached, determining a removal rate based on the measured thickness, and comparing the removal rate to an expected removal rate. However, *Toprac* does not teach, show, or suggest applying an outlier filter to remove outliers in the pre-etch measurement information, as recited in claims 1 and 18, and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

Claims 1, 3-4, 6-9, 11-13, 15, 17-18, 20, 23-26, 28-30, and 32 stand rejected under 35 U.S.C. § 102(b) as being anticipated by *Klippert II* (U. S. Patent No. 6,136,712). Applicant respectfully responds to the rejection.

Klippert II does not teach all the claim limitations of claims 1 and 18, and claims dependent thereon. *Klippert II* teaches an automated process which measures the thickness of a masking layer prior to etching. The masking layer thickness and real-time measurements control when etching is terminated. However, *Klippert II* does not teach, show, or suggest applying an outlier filter to remove outliers in the pre-etch measurement information, as recited in claims 1 and 18, and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

Claims 1, 3-4, 6-9, 11-13, 15, 17-18, 20, 23-26, 28-30, and 32 stand rejected under 35 U.S.C. § 102(b) as being anticipated by *Petrucci* (WO 01/24254) or alternatively under 35 U.S.C. § 102(e) as being anticipated by *Petrucci* (U. S. Publication No. 2003/0010750). Applicant respectfully responds to the rejection.

Petrucci does not teach all the claim limitations of claims 1 and 18, and claims dependent thereon. *Petrucci* teaches a method which includes the steps of masuring a thickness of a mask layer on top of a substrate, measuring the depth of a recess during an etching step, and stopping the etching step when the depth value reaches a sum of the target depth value and the thickness value. However, *Petrucci* does not teach, show, or suggest applying an outlier filter to remove outliers in the pre-etch measurement information, as recited in claims 1 and 18, and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

Claims 1, 3-4, 6-9, 11-13, 15, 17-18, 20, 23-26, 28-30, and 32 stand rejected under 35 U.S.C. § 102(b) as being anticipated by *Grimbergen* (U. S. Patent No. 6,390,019). Applicant respectfully responds to the rejection.

Grimbergen does not teach all the claim limitations of claims 1 and 18, and claims dependent thereon. *Grimbergen* teaches measuring the thickness of the layer to be etched on a substrate, transferring the substrate from a load-lock transfer chamber by a robot arm through a slit valve and into a process chamber, using the layer thickness to estimate operating conditions, monitoring the process by a process monitoring system to change conditions or to stop the etching process. However, *Grimbergen* does not teach, show, or suggest applying an outlier filter to remove outliers in the pre-etch measurement information, as recited in claims 1 and 18, and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

Claim Rejections 103(a)

Claims 2 and 19 stand rejected under 35 U.S.C. 103(a) as being unpatentable over *Toprac* (U. S. Patent No. 6,379,980) in view of *Payne* (U.S Patent No. 5,329,381). Claims 2 and 19 have been cancelled and incorporated into claims 1 and 18, respectively. Applicant respectfully traverses the rejection.

The teachings of *Toprac* are described above. The Examiner acknowledges that *Toprac* does not disclose applying an outlier filter to remove outliers in the pre-etch measurement information, but relies on *Payne* to disclose a special filter to remove outliers. The outlier filter of *Payne* is not the same as the outlier filter of the present invention. *Payne* discloses an automatic engraving system that scans, samples, and resizes an image. Noise is removed from the image using an outlier noise filter. The disclosed outlier filter is specifically directed toward images, in that it compares the intensity of each pixel in the image to the average intensity of its 8 neighboring pixels. If the difference is greater than a threshold value, the intensity value is replaced by its neighborhood value. (Column 8, lines 17-24.) The outlier filter of the present invention is applied to the ex-situ measurement data obtained by pre-etch measurement, and removes any data points that are outliers. (Page 3, lines 1-2.) Because *Payne* discloses replacing the outlier pixel with its neighborhood value, *Payne* does not teach, show, or suggest an outlier filter which removes the outliers in the pre-etch measurement information, as recited in claims 1 and 18.

Furthermore, there is no motivation to combine the outlier filter of *Payne* with the etch measurements of *Toprac*. *Payne* teaches an outlier filter for use in digital image processing while *Toprac* teaches a method for monitoring a material removal tool used in semiconductor device manufacturing. The kinds of data analyzed are completely different and non-related. Thus, there is no motivation gained from either *Toprac* or *Payne* to combine the two.

Therefore, *Toprac* and *Payne*, alone or in combination, do not teach, show, or suggest a method for monitoring an etch process where an outlier filter removes the outliers in the pre-etch measurement information, as recited in claims 1 and 18, and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

Claims 10, 20, and 27 stand rejected under 35 U.S.C. 103(a) as being unpatentable over *Toprac* (U. S. Patent No. 6,379,980) in view of *Yu* (U.S Patent No. 6,368,982). Applicant respectfully responds to the rejection.

The teachings of *Toprac* are described above. The Examiner relies on *Yu* as disclosing that the mask in a mask trim undergoes etching from all sides and leaves a scaled down length and that the two sides and the top are trimmed by substantially the

same trim length. However, *Yu* is silent as to the presence of any outlier filter, as recited in claim 1 on which claim 10 depends and claim 18 on which claims 20 and 27 depend.

Therefore, *Toprac* and *Yu*, alone or in combination, do not teach, show, or suggest a method for monitoring an etch process where an outlier filter removes the outliers in the pre-etch measurement information, as recited in claims 1 and 18, and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

Claims 14 and 31 stand rejected under 35 U.S.C. 103(a) as being unpatentable over *Klippert II* (U. S. Patent No. 6,136,712) in view of *Nakada* (Japan Patent No. 11-251252). Applicant respectfully responds to the rejection.

The teachings of *Klippert II* are described above. The Examiner relies on *Nakada* as disclosing that light having a desired wavelength and modulation of intensity is used for monitoing a plasma. However, *Nakada* is silent as to the presence of any outlier filter, as recited in claim 1 on which claim 14 depends and claim 18 on which claim 31 depend.

Therefore, *Klippert II* and *Nakada*, alone or in combination, do not teach, show, or suggest a method for monitoring an etch process where an outlier filter removes the outliers in the pre-etch measurement information, as recited in claims 1 and 18, and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

Claims16 and 33 stand rejected under 35 U.S.C. 103(a) as being unpatentable over *Grimbergen* (U. S. Patent No. 6,390,019) in view of *Grimbergen* (U.S Patent No. 6,406,924). Applicant respectfully responds to the rejection.

The teachings of *Grimbergen* '019 are described above. The Examiner relies on *Grimbergen* '924 as disclosing that as the structures are etched the minimas and maxima of the interferometric signal shift because the position of minima and maxima are indicative of etch depth. However, *Grimbergen* '924 is silent as to the presence of any outlier filter, as recited in claim 1 on which claim 16 depends and claim 18 on which claim 33 depends.

Therefore, *Grimbergen* '019 and *Grimbergen* '924, alone or in combination, do not teach, show, or suggest a method for monitoring an etch process where an outlier filter removes the outliers in the pre-etch measurement information, as recited in claims

1 and 18, and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

Claims 21 stands rejected under 35 U.S.C. 103(a) as being unpatentable over *Toprac* (U. S. Patent No. 6,379,980) in view of *Cha* (U.S Patent No. 6,319,767). Applicant respectfully responds to the rejection.

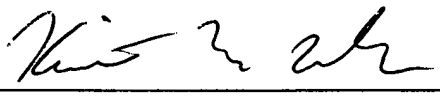
The teachings of *Toprac* are described above. The Examiner relies on *Cha* as disclosing etching a photoresist mask using a plasma etch. However, *Cha* is silent as to the presence of any outlier filter, as recited in claim 18 on which claim 21 depends.

Therefore, *Toprac* and *Cha*, alone or in combination, do not teach, show, or suggest a method for monitoring an etch process where an outlier filter removes the outliers in the pre-etch measurement information, as recited in claims 1 and 18, and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

In conclusion, the references cited by the Examiner, alone or in combination, do not teach, show, or suggest the invention as claimed.

Having addressed all issues set out in the office action, Applicant respectfully submits that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,



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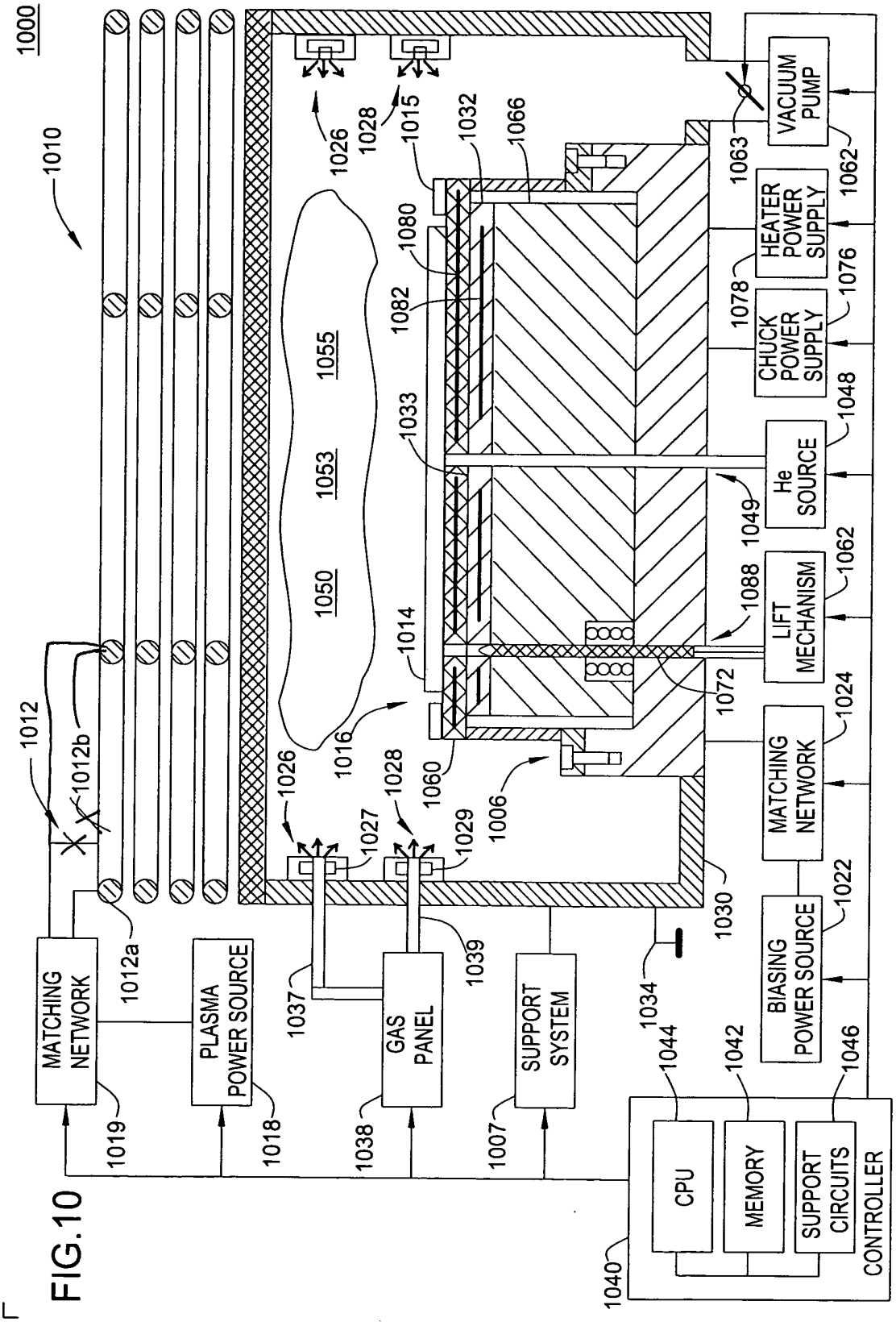

FIG. 10